CLAIMS

1.    A piezoelectric ceramics having ceramic particles, wherein:

5        said ceramic particles comprises

bismuth layer compound containing at least Sr, Ln (note that Ln is a lanthanoid element), Bi, Ti and O and including $M^{II}Bi_4Ti_4O_{15}$ type crystal ($M^{II}$ is an element composed of Sr and Ln) as a main component, and

10            an oxide of Mn as a subcomponent; and

an average particle diameter by the code length measuring method is 0.8 to 4.7 μm.

2.    The piezoelectric ceramics as set forth in
15  claim 1, wherein said $M^{II}Bi_4Ti_4O_{15}$ type crystal is expressed by a composition formula $(Sr_\alpha Ln_\beta)Bi_\gamma Ti_4O_{15}$, and "α" satisfies $\alpha = 1-\beta$, "β" satisfies $0.01 \leq \beta \leq 0.50$ and "γ" satisfies $3.80 \leq \gamma \leq 4.50$.

20        3.    The piezoelectric ceramics as set forth in claim 1 or 2, wherein a content of said oxide of Mn is 0.1 to 1.0 wt% in terms of MnO.

4.    A piezoelectric element, comprising a
25  piezoelectric substance formed by the piezoelectric ceramics as set forth in any one of claims 1 to 3.

5.    The piezoelectric element as set forth in claim 4, wherein a maximum value $Q_{max}$ of "Q" ($Q = |X|/R$,
30  wherein "X" is reactance and "R" is resistance) between a

resonant frequency and an antiresonant frequency with respect to a third harmonic wave of thickness vertical vibration at 24 MHz is 8 or larger.

5      6.    A piezoelectric ceramics having ceramic particles, wherein:

said ceramic particles comprises

bismuth layer compound containing at least Ca, Ln (note that Ln is a lanthanoid element), Bi, Ti and O

10    and including $M^{II}Bi_4Ti_4O_{15}$ type crystal ($M^{II}$ is an element composed of Ca and Ln) as a main component, and

an oxide of Mn as a subcomponent; and

an average particle diameter by the code length measuring method is 1.0 to 4.5 μm.

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7.    The piezoelectric ceramics as set forth in claim 6, wherein said $M^{II}Bi_4Ti_4O_{15}$ type crystal is expressed by a composition formula $(Ca_{1-\beta}Ln_\beta)Bi_\gamma Ti_4O_{15}$, and "β" satisfies $0.01 \leq \beta \leq 0.5$ and "γ" satisfies $3.80 \leq \gamma \leq$

20    $4.20$.

8.    The piezoelectric ceramics as set forth in claim 6 or 7, wherein a content of said oxide of Mn is 0.1 to 1.0 wt% in terms of MnO.

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9.    A piezoelectric element, comprising a piezoelectric substance formed by the piezoelectric ceramics as set forth in any one of claims 6 to 8.

30    10.    The piezoelectric element as set forth in

claim 9, wherein a maximum value $Q_{max}$ of "Q" (Q = |X|/R,
wherein "X" is reactance and "R" is resistance) between a
resonant frequency and an antiresonant frequency with
respect to a third harmonic wave of thickness vertical
5 vibration at 60 MHz is 6 or larger.


11. A piezoelectric ceramics having ceramic
particles, wherein:
said ceramic particles comprises
10 bismuth layer compound containing at least Ba,
Sr, Ln (note that Ln is a lanthanoid element), Bi, Ti and
O and including $M^{II}Bi_4Ti_4O_{15}$ type crystal ($M^{II}$ is an
element composed of Ba, Sr and Ln) as a main component,
and
15 an oxide of Mn and an oxide of Ge as a
subcomponent; and
an average particle diameter by the code length
measuring method is 0.4 to 3.2 μm.


20 12. The piezoelectric ceramics as set forth in
claim 11, wherein
said $M^{II}Bi_4Ti_4O_{15}$ type crystal is expressed by a
composition formula $(Ba_{1-\alpha-\beta}Sr_\alpha Ln_\beta)Bi_Y Ti_4O_{15}$, and
"α" satisfies $0.1 \leq \alpha \leq 0.6$, "β" satisfies $0.05 \leq \beta$
25 $\leq 0.5$ and "γ" satisfies $3.90 \leq \gamma \leq 4.30$ in said
composition formula.


13. The piezoelectric ceramics as set forth in
claim 11 or 12, wherein
30 a content of said oxide of Mn is 0.1 to 1.0 wt% in

terms of MnO, and

a content of said oxide of Ge is 0.05 to 0.5 wt% in

terms of $GeO_2$.

5    14.    A piezoelectric element, comprising a

piezoelectric substance formed by the piezoelectric

ceramics as set forth in any one of claims 11 to 13.

15.    The piezoelectric element as set forth in

10    claim 14, wherein a maximum value $Q_{max}$ of "Q" (Q = $|X|$/R,

wherein "X" is reactance and "R" is resistance) between a

resonant frequency and an antiresonant frequency with

respect to the fundamental wave of thickness-shear

vibration at 8 MHz is 23 or larger.